MKTG 864: Analysis of Flipkart E- commerce Smartphones Dataset

Introduction

Flipkart, one of India's biggest online marketplaces, plays a critical role in molding customers' tastes and decision-making processes in the world of e-commerce. Flipkart provides a diverse range of smartphone options to tech-savvy shoppers looking for the perfect gadget. We evaluated a large dataset containing a variety of characteristics to acquire insights on customer behavior and interactions with smartphone services. This analysis sheds light on crucial factors influencing user reviews, discounted prices, and purchase habits on Flipkart's website. Flipkart can use these vital insights to fine-tune its marketing strategy, improve the overall customer experience, and preserve its position as a market leader in the competitive smartphone market.

The analysis of the dataset for smartphones on Flipkart revealed crucial insights for effective marketing strategies. By understanding the impact of discounts on customer ratings, Flipkart can strike a balance to maintain positive reviews and brand reputation. The combination of memory, storage, and display size influences pricing, enabling Flipkart to showcase advanced features for premium prices. Recognizing the significance of battery capacity and original prices in customer ratings, Flipkart can position smartphones as value-driven choices with long-lasting performance. Additionally, camera quality and storage capacity play a role in discounts, allowing Flipkart to target diverse customer segments effectively. Armed with these insights, Flipkart can tailor its marketing efforts, optimize product offerings, and create a personalized shopping experience, strengthening customer satisfaction and competitive advantage.

Dataset and X and Y variables

The dataset consists of various attributes associated with smartphones. Among these attributes, "brand," "model," and "color" represent categorical or string variables, indicating distinct categories and characteristics. On the other hand, the remaining attributes such as "original price," "discounted price," "discount offered," "ratings," "reviews," "memory," "storage," "rear camera," "front camera," "display size," and "battery capacity" are numeric variables, representing measurable quantities.

We focus on numerical variables for our study because they give quantifiable and continuous data sets that allow us to create correlations, run regression studies, and get valuable insights

into the interactions between various features. These elements work together to shape customer impressions and buying decisions. The analysis can acquire significant information about decision-making and marketing strategies by investigating the interactions and impacts of these numerical variables on customer ratings and discounted prices and it also acquire insights into how these factors interact and effect customer ratings and reduced prices for various smartphone models by evaluating correlations and regression analysis. For a comprehensive view of the dataset, please refer to the Image 1 in the appendix

Provide descriptive statistics tables and interpret Dependent and Independent variable

The dataset includes details regarding smartphones available on the internet marketplace Flipkart refer Table 2. Customer ratings, discounted prices, discount offered, memory, storage, display size, battery capacity, original price, and storage capacity are all included. This information is useful for determining customer preferences, pricing tactics, and the influence of smartphone features on customer decisions.

- Customer Ratings (Y):

  Customers consistently provide positive ratings (mean 4.292) with low variation (std. deviation 0.1412), reflecting high satisfaction.
- Discounted Price (Y) and Discount Offered (Y):

  Varied discounts (mean 4673.83, std. deviation 3360.642) significantly impact customer ratings and prices (mean 13729.51, std. deviation 5843.446).
- Memory (X):

  Memory capacity (mean 5.11) significantly influences ratings and discounts, with higher coefficients indicating stronger effects.
- Storage (X):

  Storage capacity (mean 94.36) significantly affects discounted prices, playing a crucial role in pricing strategies.
- Display Size (X):

  Display size (mean 16.6998) influences ratings, while not statistically impacting prices.
- Battery Capacity (X):

  Battery strength (mean 5071.31) significantly and positively affects customer ratings.
- Original Price (X):

  Higher original prices significantly impact both ratings and discounted prices.

- Rear Camera (X) and Front Camera (X):

  Camera quality (rear: mean 51.11, front: mean 10.95) significantly impacts customer ratings.

These insights, backed by statistical significance, guide precise product offerings and marketing strategies for enhanced customer satisfaction and pricing optimization.

In summary, Analyzing these variables helps understand customer satisfaction, purchase behavior, and the impact of different specifications on smartphone prices and preferences.

R^2 and model fit

The coefficient of determination (R2) for the model is 0.130, indicating that approximately 13.0% of the variance in the dependent variable can be explained by the independent variables. For a comprehensive overview of the model's goodness of fit, please refer to the detailed summary provided in Table 3 in the appendix, which includes the R-squared value and other relevant statistics.

The estimated regression equation is:

$Y(Rating) = \beta0 + \beta1(battery\_capacity) + \beta2(storage) + \beta3(reviews) + \beta4(discount\_offered) + \beta5(display\_size) + \beta6(rear\_camera) + \beta7(discounted\_price) + \varepsilon$

Where:

Y represents the dependent variable.

β0 is the constant term.

β1, β2, β3, β4, β5, β6, and β7 are the coefficients associated with battery_capacity, storage, reviews, discount_offered, display_size, rear_camera, and discounted_price, respectively.

battery_capacity, storage, reviews, discount_offered, display_size, rear_camera, and discounted_price are the independent variables.

ε represents the error term.

When considering the model's complexity, the adjusted R-squared value of 0.099 indicates that the model accounts for the number of predictors, indicating that the independent variables

explain about 9.9% of the variation. The standard error of the estimate (0.1345) represents the average deviation of the actual values from the projected values, indicating the model's accuracy in predicting the dependent variable.

Graph and Pearson co-relation

For visual depictions of the relationships between the variables addressed below, please see the Figure 2 for scatter plots and Table 1 for the Pearson co relation in the appendix.

- Discounted Price and Ratings:

  The scattered plot of Discounted Price vs Ratings indicates a small increasing trend, indicating that discounts may have a minor impact on ratings. However, the dispersion of points suggests that factors other than price have a significant effect in consumer assessments. To improve consumer happiness, marketing initiatives should take a complete approach.

- Ratings and Rear Camera:

  The random distribution of points in the scatter plot for Rear Camera and evaluations indicates that camera quality has little influence on customer evaluations. This implies that marketing efforts focused simply on camera characteristics may not result in significant increases in overall ratings. Diversifying features could be important.

- Battery Capacity and Ratings:

  The scatter plot of Battery Capacity vs Ratings reveals a little positive trend. Although not statistically significant, data shows that stressing improved battery life in marketing communications may resonate with customers and contribute to higher evaluations.

- Discounted Price and Battery Capacity:

  A declining trend is visible in the scatter plot of Discounted Price and Battery Capacity. This intriguing association suggests that bigger discounts may result in devices with somewhat lower battery capacity. From a marketing standpoint, this could have an impact on pricing strategies and product positioning.

Bivariate Analysis Selection and Reason

Because of the nature of the variables involved, a regression model was chosen as the optimal strategy for the investigation. All variables under examination are continuous in nature,

including the dependent variable and the key independent variables. Regression analysis is well-suited for investigating how changes in independent continuous variables relate to changes in the dependent variable, allowing for a thorough investigation of their relationships. This method provides a more sophisticated knowledge of how each continuous predictor affects the outcome.

While ANOVA (Analysis of Variance) is also useful for comparing means across groups, it is better suited for categorical independent variables. Regression provides a more effective framework for capturing the subtle interactions and impacts between these factors and the dependent variable in this setting, where the variables of interest are all continuous.

Results

In this comprehensive marketing research analysis, we delved into various factors that impact customer perceptions and behaviors related to smartphone purchases on Flipkart. The findings provided light on critical factors influencing consumer ratings, discounted prices, and overall satisfaction. Let's turn the findings into practical recommendations

- **Impact of Discount Offered on Customer Ratings:**
  Our analysis demonstrates a significant relationship between the discount offered and consumer ratings of cellphones (see Appendix, Table 4). The magnitude of the effect is large. Customer ratings of cellphones improve by approximately 0.243 units for every ₹1 increase in the discount offered. However, it is vital to note that the negative sign indicates that bigger discounts are related with somewhat lower customer ratings on Flipkart.
- **Collective Influence of Memory, Storage, and Display Size on Discounted Price:**
  Our research demonstrates that memory and storage play significant roles in determining the discounted price of smartphones (see Appendix, Table 5)Our research shows that memory and storage play important roles in influencing the discounted pricing of smartphones. The reduced price climbs by roughly ₹1245.492 for every unit increase in memory, while an equivalent increase in storage results in an increase of approximately ₹60.789. Notably, the size of the display has no effect on the lowered pricing. Manufacturers can use these knowledge to strategically position their products and optimize their pricing strategies.
- **Joint Effect of Battery Capacity and Original Price on Customer Ratings:**

The study uncovers a distinct relationship between the original price and customer ratings (see Appendix, Table 6) The analysis reveals a clear link between the original pricing and customer ratings. Customer ratings rise by approximately 0.823 units for every ₹ (Rupees) increase in the original price. However, battery capacity has no discernible effect. Marketers can use this information to boost customer satisfaction by emphasizing the value of initial pricing in promotional campaigns.

- **Impact of Storage Capacity, Rear Camera, and Front Camera on Discount Offered:** observe that both rear and front camera qualities influence the amount of discount offered (see Appendix, Table 7). The research discover that the quality of both the back and front cameras influences the amount of discount granted. A one-unit improvement in rear camera quality translates in a ₹46.168 rise in the discount offered. Similarly, a unit improvement in front camera quality results in a ₹388.666 increase in the discount granted. In comparison, storage capacity has little effect on the discount. Marketers can use the attractiveness of improved camera features to boost pricing tactics.

In essence, the research gives useful data to help steer Flipkart's smartphone marketing initiatives. Balancing reductions, highlighting memory and storage, positioning based on initial cost, and utilizing camera features emerge as important options for improving customer happiness and driving competitive advantage. Marketers can better connect their products with growing consumer tastes and optimize their product offerings for success in the volatile smartphone market by understanding these dynamics.

Marketing Implication and Major Takeaway

The extensive marketing research uncovered critical insights that have the ability to significantly improve Flipkart's smartphone market tactics.

The effect of discounts on customer ratings reveals an opportunity for Flipkart to deliberately use discounts to increase customer satisfaction and ratings. It will be critical to balance discounts in order to minimize potential negative effects on ratings.

The relevance of emphasizing memory, storage, and affordability in product positioning is shown by the influence of these features. Flipkart's pricing methods can be improved by capitalizing on the major impact of memory and storage on smartphone pricing.

The relationship between the original price and customer ratings shows that Flipkart should stress the importance of early pricing in its promotional campaigns to increase customer happiness and ratings.

Understanding the impact of camera quality on discounts allows Flipkart to use increased camera features as a price strategy, appealing to customers and perhaps increasing sales.

Essentially, these statistics provide Flipkart with meaningful insights for tailoring its smartphone marketing campaigns. Flipkart may improve customer satisfaction, reviews, and overall market competitiveness by strategically employing discounts, optimizing pricing depending on memory and storage, emphasizing initial pricing value, and leveraging camera quality.

The major takeaways for Flipkart's smartphone marketing strategies are as follows:

1. Strategic Discounting: Use discounts wisely to boost customer happiness and ratings. To avoid any negative effects on client views, balance discount offers.
2. Memory, Storage, and Pricing: In product positioning, emphasize the significance of memory and storage features. Utilize the major impact of these variables on smartphone pricing to optimize pricing strategies.
3. Emphasize Initial Pricing Value: Take advantage of the association between initial pricing and customer ratings. To increase customer happiness and ratings, highlight the benefit of early pricing in promotional activities.
4. Camera Quality as a Differentiator: As a pricing strategy, use increased camera functionality. Improved camera quality can be used to boost product appeal, potentially leading to increased sales.

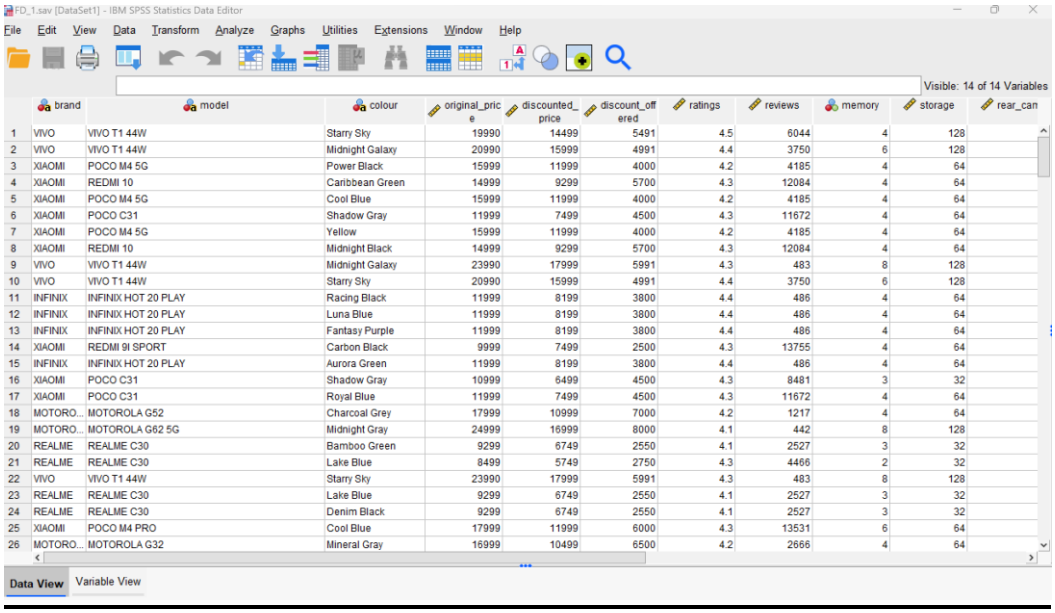
Flipkart can improve its smartphone products, improve customer satisfaction and ratings, and position itself competitively in the changing smartphone market by incorporating these lessons.

Managerial Implications and Summary

The strategic approach for Flipkart's smartphone segment is informed by our marketing research analysis and includes several essential elements. To cater to tech-savvy preferences, we'll fine-tune discount techniques to find a balance between customer ratings and sales, while emphasizing memory, storage, and camera quality. Customer feedback and original pricing

insights will be used to optimize pricing tiers. We will prioritize camera technology innovation, improving tailored offers and recommendations. Adaptability will be driven by continuous improvement, competitive benchmarking, and an agile stance. Collaboration across departments will build an innovative, customer-centric culture. This comprehensive strategy promotes long-term growth, customer happiness, and market leadership.

APPENDIX



FD_1.sav [DataSet1] - IBM SPSS Statistics Data Editor

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Visible: 14 of 14 Variables

	brand	model	colour	original_price	discounted_price	discount_offered	ratings	reviews	memory	storage	rear_can
1	VIVO	VIVO T1 44W	Starry Sky	19990	14499	5491	4.5	6044	4	128	
2	VIVO	VIVO T1 44W	Midnight Galaxy	20990	15999	4991	4.4	3750	6	128	
3	XIAOMI	POCO M4 5G	Power Black	15999	11999	4000	4.2	4185	4	64	
4	XIAOMI	REDMI 10	Caribbean Green	14999	9299	5700	4.3	12084	4	64	
5	XIAOMI	POCO M4 5G	Cool Blue	15999	11999	4000	4.2	4185	4	64	
6	XIAOMI	POCO C31	Shadow Gray	11999	7499	4500	4.3	11672	4	64	
7	XIAOMI	POCO M4 5G	Yellow	15999	11999	4000	4.2	4185	4	64	
8	XIAOMI	REDMI 10	Midnight Black	14999	9299	5700	4.3	12084	4	64	
9	VIVO	VIVO T1 44W	Midnight Galaxy	23990	17999	5991	4.3	483	8	128	
10	VIVO	VIVO T1 44W	Starry Sky	20990	15999	4991	4.4	3750	6	128	
11	INFINIX	INFINIX HOT 20 PLAY	Racing Black	11999	8199	3800	4.4	486	4	64	
12	INFINIX	INFINIX HOT 20 PLAY	Luna Blue	11999	8199	3800	4.4	486	4	64	
13	INFINIX	INFINIX HOT 20 PLAY	Fantasy Purple	11999	8199	3800	4.4	486	4	64	
14	XIAOMI	REDMI 9I SPORT	Carbon Black	9999	7499	2500	4.3	13755	4	64	
15	INFINIX	INFINIX HOT 20 PLAY	Aurora Green	11999	8199	3800	4.4	486	4	64	
16	XIAOMI	POCO C31	Shadow Gray	10999	6499	4500	4.3	8481	3	32	
17	XIAOMI	POCO C31	Royal Blue	11999	7499	4500	4.3	11672	4	64	
18	MOTORO...	MOTOROLA G52	Charcoal Grey	17999	10999	7000	4.2	1217	4	64	
19	MOTORO...	MOTOROLA G62 5G	Midnight Gray	24999	16999	8000	4.1	442	8	128	
20	REALME	REALME C30	Bamboo Green	9299	6749	2550	4.1	2527	3	32	
21	REALME	REALME C30	Lake Blue	8499	5749	2750	4.3	4466	2	32	
22	VIVO	VIVO T1 44W	Starry Sky	23990	17999	5991	4.3	483	8	128	
23	REALME	REALME C30	Lake Blue	9299	6749	2550	4.1	2527	3	32	
24	REALME	REALME C30	Denim Black	9299	6749	2550	4.1	2527	3	32	
25	XIAOMI	POCO M4 PRO	Cool Blue	17999	11999	6000	4.3	13531	6	64	
26	MOTORO...	MOTOROLA G32	Mineral Gray	16999	10499	6500	4.2	2666	4	64	

Data View Variable View

Fig 1: Dataset

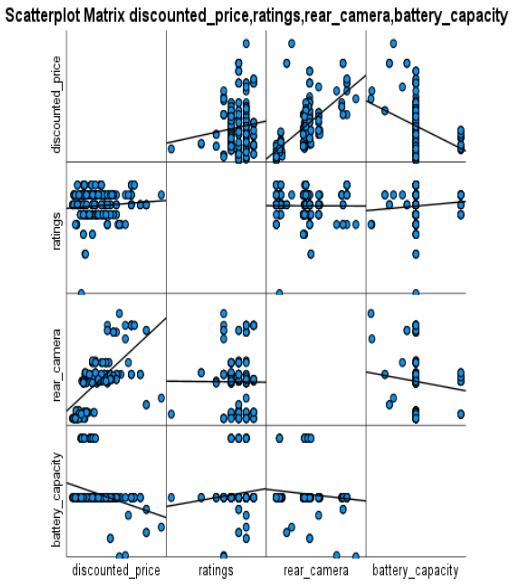

Fig 2: relationships between key variables

Tables

Table 1: Pearson Corelation

Correlations

		ratings	discounted_price	rear_camera	battery_capacity
ratings	Pearson Correlation	1	.089	-.005	.090
	Sig. (2-tailed)		.193	.948	.190
	N	214	214	204	214
discounted_price	Pearson Correlation	.089	1	.672**	-.328**
	Sig. (2-tailed)	.193		<.001	<.001
	N	214	214	204	214
rear_camera	Pearson Correlation	-.005	.672**	1	-.113
	Sig. (2-tailed)	.948	<.001		.108
	N	204	204	204	204
battery_capacity	Pearson Correlation	.090	-.328**	-.113	1
	Sig. (2-tailed)	.190	<.001	.108	
	N	214	214	204	214

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2 : Descriptive statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
original_price	214	7999	74999	18403.34	7837.471
discounted_price	214	5299	34999	13729.51	5843.446
discount_offered	214	500	40000	4673.83	3360.642
ratings	214	3.4	4.5	4.292	.1412
memory	214	2	8	5.11	1.802
storage	214	32	256	94.36	46.224
display_size	214	15.60	17.32	16.6998	.26424
battery_capacity	214	4000	6000	5071.31	335.257
rear_camera	204	8	132	51.11	29.322
front_camera	214	5	32	10.95	5.686
Valid N (listwise)	204				

$$Y=\beta0+\beta1\times original\_price+\beta2\times discounted\_price+\beta3\times discount\_offered+\beta4\times memory+\beta5\times storage+\beta6\times display\_size+\beta7\times battery\_capacity+\beta8\times rear\_camera+\beta9\times front\_camera+\varepsilon$$

R^2 and Model fit

Table 3: R^2 Model

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.361[a]	.130	.099	.1345

a. Predictors: (Constant), battery_capacity, storage, reviews, discount_offered, display_size, rear_camera, discounted_price

$Y(\text{Rating}) = \beta 0 + \beta 1(\text{battery\_capacity}) + \beta 2(\text{storage}) + \beta 3(\text{reviews}) + \beta 4(\text{discount\_offered}) + \beta 5(\text{display\_size}) + \beta 6(\text{rear\_camera}) + \beta 7(\text{discounted\_price}) + \varepsilon$

Table 4: Regression Model

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.030	.675		5.966	<.001
	discounted_price	1.560E-5	.000	.656	4.852	<.001
	discount_offered	-1.002E-5	.000	-.243	-3.167	.002
	reviews	5.043E-6	.000	.152	2.166	.032
	storage	-.001	.000	-.323	-2.916	.004
	rear_camera	-.001	.000	-.166	-1.707	.089
	display_size	-.012	.044	-.021	-.261	.795
	battery_capacity	7.934E-5	.000	.185	2.258	.025

a. Dependent Variable: ratings

Ratings = 4.030 - (1.002E-5 * discount_offered)

Magnitude

If the discount offered increases by 1₹(one Rupees), the customer ratings of smartphones increases by approximately 0.243 units, The negative sign suggests that higher discounts are associated with slightly lower customer ratings on Flipkart.

Table 5: Regression Model

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	18667.027	15138.085		1.233	.219
	memory	1245.492	213.278	.384	5.840	<.001
	storage	60.789	8.357	.481	7.274	<.001
	display_size	-1020.398	912.015	-.046	-1.119	.264

a. Dependent Variable: discounted_price

Equation:

Discounted_price = 18667.027 + (1245.492 * memory) + (60.789 * storage) - (1020.398 * display_size)

- For every one unit increase in memory, the discounted price of smartphones increases by approximately ₹1245.492.
- For every one unit increase in storage, the discounted price of smartphones increases by approximately ₹ 60.789.

Table 6: Regression Model

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.259	.613		6.952	<.001
	discount_offered	-1.998E-5	.000	-.476	-4.230	<.001
	memory	-.038	.009	-.487	-4.222	<.001
	storage	.000	.000	-.062	-.512	.609
	display_size	-.017	.041	-.033	-.426	.671
	battery_capacity	7.051E-5	.000	.167	2.100	.037
	original_price	1.483E-5	.000	.823	5.143	<.001

a. Dependent Variable: ratings

Equation:

Ratings = 4.259 + (7.051E-5 * battery_capacity) + (1.483E-5 * original_price)

Magnitude:

- For every one unit increase in the original price, the customer ratings of smartphones increase by approximately 0.823 units.

Table 7: Regression Model

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1732.310	509.231		3.402	<.001
	storage	11.005	5.676	.150	1.939	.054
	rear_camera	-46.168	10.786	-.394	-4.280	<.001
	front_camera	388.666	51.232	.652	7.586	<.001

a. Dependent Variable: discount_offered

Equation:

Discount_offered = 1732.310 + (11.005 * storage) - (46.168 * rear_camera) + (388.666 * front_camera)

- For every one unit increase in rear camera quality, the discount offered increases by approximately ₹46.168.
- For every one unit increase in front camera quality, the discount offered increases by approximately ₹388.666.